07-SC-02 Electron Beam Ion Source
Brookhaven National Laboratory, Upton, New York
Project Data Sheet is for Construction

1. Significant Changes

Due to reduced funding in the FY 2007 and FY 2008 enacted Appropriations for this project, the balance of construction funding necessary to complete the project was delayed and is now requested in FY 2009.

Critical Decision 2, Approve Performance Baseline and Critical Decision 3, Approve Start of Construction, were approved in 4Q FY 2006.

A Federal Project Director with certification level II has been assigned to this project

This is a joint DOE-NASA project. NASA funding contributions allow for project completion in a more-timely manner, consistent with NASA mission requirements.

2. Design, Construction, and D&D Schedule

(fiscal quarter or date)

	CD-0	CD-1 (Design Start)[a]	Design/PED Complete	CD-2	CD-3 (Construction Start)[b]	CD-4 (Construction Complete)	D&D Start	D&D Complete
FY 2007	08/02/2004	1Q 2006	4Q 2007	4Q 2006	2Q 2007	2Q 2010	N/A	N/A
FY 2008	08/02/2004	1Q 2006	4Q 2007	4Q 2006	2Q 2007	2Q 2010	N/A	N/A
FY 2009	08/02/2004	1Q 2006	4Q 2007	4Q 2006	2Q 2007	4Q 2010	N/A	N/A

CD-0—Approve Mission Need
CD-1—Approve Alternative Selection and Cost Range
CD-2—Approve Performance Baseline
CD-3—Approve Start of Construction
CD-4—Approve Start of Operations or Project Closeout
D&D Start—Start of Demolition & Decontamination (D&D) work
D&D Complete—Completion of D&D work

3. Baseline and Validation Status

(dollars in thousands)

	TEC, PED	TEC, Construction	TEC, Total	OPC Except D&D	OPC, Total	TPC
FY 2007	2,100	11,600	13,700	1,100	1,100	14,800
FY 2008	2,100	11,600	13,700	1,100	1,100	14,800
FY 2009	2,100	11,600	13,700	1,100	1,100	14,800

[a] CD-1 was approved on 9/30/2005. Engineering and design activities began in 1Q FY2006.
[b] CD-2 and CD-3 were approved on 9/29/2006. Construction activities started after the budget appropriation in 2Q FY2007.

4. Project Description, Justification, and Scope

This Project Data Sheet requests final construction funding for the Electron Beam Ion Source (EBIS) project at Brookhaven National Laboratory (BNL). Project engineering and design (PED) funding was received in FY 2006 and in FY 2007 under project number 06-SC-02.

The EBIS project will provide a new heavy ion pre-injector for the Relativistic Heavy Ion Collider (RHIC) based on a high charge state heavy ion source, a Radio Frequency Quadrupole (RFQ) accelerator, and a short Linear Accelerator (Linac). The highly successful development of an Electron Beam Ion Source at BNL now makes it possible to replace the present pre-injector that is based on electrostatic Tandems with a reliable, low maintenance Linac-based pre-injector.

The new pre-injector will be installed in the lower equipment bay of the existing 200 MeV Linac Building. Modifications to this building will be required to provide an injection path into the Booster and house the new equipment.

In summary, the proposed new pre-injector offers the following advantages:

- The EBIS replaces the 35 year-old Tandems with a modern, Linac-based pre-injector.
- The RFQ and linac technology is simpler, more modern and robust, and will require significantly less effort to maintain and operate thus potentially reducing operational costs.
- The 860 meter long Tandem-to-Booster transport line will be replaced with a 30 to 40 meter transport system.
- The EBIS eliminates current limitations on ion species.
- The single EBIS would allow pulse-to-pulse switching between any two species. This increased flexibility will provide the ability to meet the multiple, simultaneous needs of RHIC, NASA, and the Alternating Gradient Synchrotron (AGS).
- Beam stability will be improved with the elimination of stripping foils now required in the tandems.

The replacement of the existing ion source at Brookhaven National Laboratory (BNL) with the proposed EBIS offers additional capabilities to NASA in the operation of the NASA Space Radiation Laboratory (NSRL) at BNL. NASA is providing a total of $4,500,000 in funding, reducing the Total Project Cost of EBIS to DOE, in order to accelerate the project profile and decrease project duration.

The project is being conducted in accordance with the project management requirements in DOE 413.3A and DOE 413.3-1, Program and Project Management for the Acquisition of Capital Assets, and all appropriate project management requirements have been met.

5. Financial Schedule

(dollars in thousands)

	Appropriations	Obligations	Costs
Total Estimated Cost (TEC)			
PED			
FY 2006	1,980	1,980	1,322
FY 2007	120	120	778
Total, PED (06-SC-02)	2,100	2,100	2,100

(dollars in thousands)

	Appropriations	Obligations	Costs
Construction			
FY 2007	5,000	5,000	1,796
FY 2008	4,162	4,162	5,200
FY 2009	2,438	2,438	4,604
Total, Construction	11,600	11,600	11,600
TEC			
FY 2006	1,980	1,980	1,322
FY 2007	5,120	5,120	2,574
FY 2008	4,162	4,162	5,200
FY 2009	2,438	2,438	4,604
Total, TEC	13,700	13,700	13,700
Other Project Cost (OPC)			
OPC except D&D			
FY 2005	700	700	700
FY 2006	100	100	100
FY 2007	—	—	—
FY 2008	—	—	—
FY 2009	300	300	300
Total, OPC	1,100	1,100	1,100
Total Project Cost (TPC)			
FY 2005	700	700	700
FY 2006	2,080	2,080	1,422
FY 2007	5,120	5,120	2,574
FY 2008	4,162	4,162	5,200
FY 2009	2,738	2,738	4,904
Total, TPC	14,800	14,800	14,800

6. Details of Project Cost Estimate

Total Estimated Costs

(dollars in thousands)

	Current Total Estimate	Previous Total Estimate	Original Validated Estimate
Preliminary and Final Design (PED No. 06-SC-02)	2,100	2,100	2,100
Construction Phase			
Site Preparation	695	695	695
Equipment	9,102	8,360	8,805
Contingency	1,803	2,545	2,100
Total, Construction	11,600	11,600	11,600
Total, TEC	13,700	13,700	13,700
Other Project Cost (OPC)			
OPC except D&D			
Conceptual Planning	200	200	200
R&D	600	600	600
Start-up	300	250	200
Contingency	—	50	100
Total, OPC	1,100	1,100	1,100
Total, TPC	14,800	14,800	14,800
Total Contingency	1,803	2,595	2,200

7. Schedule of Project Costs

For schedule of project costs, see Section 5, “Financial Schedule.”

8. Related Operations and Maintenance Funding Requirements

Start of Operation or Beneficial Occupancy (fiscal quarter)	4Q FY 2010
Expected Useful Life (number of years)	25
Expected Future start of D&D for new construction (fiscal quarter)	1Q FY 2035

(Related Funding Requirements)

Costs to operate EBIS are included in the RHIC Operations budget and they are not considered incremental costs.

9. Required D&D Information

This upgrade project will not create any new building square footage, and thus is not subject to the “one-for-one” replacement requirement.

10. Acquisition Approach

The Acquisition Strategy was approved in 4Q FY 2005 with CD-1 approval. Design and inspection of the facilities and equipment will be by the operating contractor and Architect-Engineer (A-E) subcontractor as appropriate. A-E design services will be done by a combination of BNL and competitively bid lump sum contracts administered by the BNL. To the extent feasible, procurements will be accomplished by fixed-price contracts awarded on the basis of competitive bidding. Project and design management, inspection, coordination, tie-ins, testing and checkout witnessing, and acceptance will be performed by the BNL operating contractor.